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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,843	12/22/2003	Jimmy D. Holdahl	CV003-US2	9078

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Tyco Electronics Corporation
Intellectual Property Law Dept.
307 Constitution Drive, MS R20/2B
Menlo Park, CA 94025-1164

EXAMINER

POKER, JENNIFER A

ART UNIT	PAPER NUMBER
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2832

DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/743,843

Applicant(s)

HOLDAHL ET AL.

Examiner

Jennifer A. Poker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>02/27/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

General Status

1. This is a first action on the merits of application filed on December 22, 2003. Claims 1-24 are pending and are being examined.

Drawings

2. This application contains informal drawings. When the application is allowed, applicant will be required to submit new formal drawings. The drawings are acceptable for examination purposes, but the handwritten references in figures 1-4 make the illustrations difficult to view.

Claim Objections

3. Claim 13 is objected to because of the following informalities: examiner believes that the term, "*wet*" as seen on the first line of the claim, should be replaced with the term, "*set*". Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3, and 7-11 are rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent Number 6,392,519 to Ronning.

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Regarding claims 1 and 11, Ronning discloses an electromagnetic device, such as an inductor; the device comprising:

- (1) two windings, thereby forming a transformer, which define an inside space (figure 1; abstract; column 3, lines 5, 8, 9);
- (2) an inner magnetic core which passes through the inner space provided by the windings (figure 1; column 3, lines 4-7);
- (3) an outer magnetic structure (magnetic cup) having a top wall and a surrounding side wall, which overlies the inner core and windings, and because the surrounding side wall is annular, at every point there is an opposing point (figure 1; column 3, line 18);
- (4) gaps (cavities-“24”) between the inner core and the inner wall of the surrounding structure (figure 2; column 3, lines 35 & 43-44).

Ronning discloses the claimed invention except for the wire being an insulated conductor. It would have been obvious to one having ordinary skill in the art, at the time the invention was made to insulate the coil/wire since it was known in the art that insulating a coil/wire prevents electrical contact between turns in adjacent layers, limiting winding losses.

Regarding claim 3, Ronning discloses the claimed invention except for a “box-like” shaped outer core. It would have been obvious to one having ordinary skill in the art, at the time the invention was made, to utilize a suitable shape for a surrounding core structure, since applicant has not disclosed that the “box-like” shape solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with any shaped outer core, such as the annular core disclosed by Ronning.

Regarding claim 7, Ronning further illustrates in figure 2 that the inner core has recesses. Additionally, applicant states that the recess is used to control inductive characteristic rolloff. It has

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been held that a recitation with respect to the manner in which a claimed apparatus/component is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus/component satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

Regarding claim 8, Ronning further discloses that iron may be used for the material of the inner core and that an alloy may be used for the material of the outer surrounding structure (column 3, lines 11-13 & 19-20).

Regarding claims 9 and 10, Ronning further discloses that heat generated in the windings is of high concern because effective heat transfer across multiple turns of insulated wire is difficult to achieve while maintaining moderate temperature gradients in the wires, therefore, it is known to apply a potting material to encapsulate the winding. Electrical insulation and air gaps associated with the turns of wire make conduction of heat across the winding very inefficient. Therefore, to eliminate air gaps and to increase the effective thermal conductivity, a potting material is used to encapsulate the inner coil and core (abstract; column 1, lines 40-49).

6. Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 6,392,519 to Ronning in view of U.S. Patent Number 6,252,486 to Wolf.

Ronning discloses the claimed invention except for the flattened shape of the coil and core.

Wolf discloses a low profile magnetic component comprising planar magnetic components, such as windings, in order to utilize the component in a volume-restricted space, i.e., reduced height and/or reduced total volume. (Column 1, lines 19-21)

One skilled in the art, at the time the invention was made, would have found it obvious to combine the teachings of Ronning with the teachings of Wolf, and incorporate a planar winding

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structure within the inductive device to minimize the size of the component in order to use it in a volume-restricted space.

7. Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 6,392,519 to Ronning in view of U.S. Patent Number 6,285,272, to Boytor, et al.

Ronning discloses the claimed invention except for the coil ends having contact surfaces to facilitate surface mounting of the inductor to a PCB.

Boytor, et al, disclose a low profile inductive component comprising an insulated electric wire, wound around the center section of a core and having ends connected to the bottom of soldering pads. The ends are press fit against the soldering pads to ensure that the ends will be soldered to the lands on a PCB. (Column 4, lines 8-14) (Figure 1)

One skilled in the art, at the time the invention was made, would have found it obvious to combine the teachings of Ronning with the teachings of Boytor, et al, and expose ends of an insulated conductor in order to ensure contact with a PCB.

8. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 6,392,519 to Ronning in view of U.S. Patent Number 6,285,272, to Boytor, et al, as applied to claim 5 above, and further in view of European Patent Number 1032001 to Basteres, et al.

Ronning in view of Boytor, et al, disclose the claimed invention except for coating the coil ends with an antioxidant.

Basteres, et al, discloses an inductor assembly formed of a first spiral wound metal strip. The metal strip is formed of copper and is covered, on its faces in contact with the external medium, with a thin gold layer. The function of the gold layer is to protect the copper strip from oxidation

phenomena, which, as is known, degrade the conducting properties of copper. (Column 6, lines 46-53)

One skilled in the art, at the time the invention was made, would have found it obvious to combine the teachings of Ronning in view of Boytor, et al, with the teachings of Basteres, et al, and coat the coil ends with a thin gold layer in order to protect the copper wire from oxidation so no degradation of the conducting properties occurs.

9. Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 6,392,519 to Ronning in view of U.S. Patent Number 6,252,486 to Wolf and further in view of U.S. Patent Number 6,285,272, to Boytor, et al.

Ronning discloses an electromagnetic device, such as an inductor; the device comprising:

- (1) two windings spiraled three-dimensionally about an axis, thereby forming a transformer, which define an inside space (figure 1; abstract; column 3, lines 5, 8, 9);
- (2) an inner magnetic core which passes through the inner space provided by the windings (figure 1; column 3, lines 4-7);
- (3) an outer magnetic structure (magnetic cup) having a top wall and a surrounding side wall, which overlies the inner core and windings, and because the surrounding side wall is annular, at every point there is an opposing point (figure 1; column 3, line 18);
- (4) gaps (cavities-"24") between the inner core and the inner wall of the surrounding structure (figure 2; column 3, lines 35 & 43-44).
- (5) potting material within the gaps to encapsulate the winding (abstract; column 1, lines 40-49).

Although Ronning doesn't specifically state, "helically wound", the winding is still three-dimensionally wound about a central axis. The definition of a helix is a three-dimensional spiral.

Ronning discloses the claimed invention except for the wire being an insulated conductor and a "box-like" shape. It would have been obvious to one having ordinary skill in the art, at the time the invention was made to insulate the coil/wire since it was known in the art that insulating a coil/wire prevents electrical contact between turns in adjacent layers, limiting winding losses. Regarding the box-like shape, It would have been obvious to one having ordinary skill in the art, at the time the invention was made, to utilize a suitable shape for a surrounding core structure, since applicant has not disclosed that the "box-like" shape solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with any shaped outer core, such as the annular core disclosed by Ronning.

Ronning discloses the claimed invention except for the flattened shape of the coil and core.

Wolf discloses a low profile magnetic component comprising planar magnetic components, such as windings, in order to utilize the component in a volume-restricted space, i.e., reduced height and/or reduced total volume. (Column 1, lines 19-21)

One skilled in the art, at the time the invention was made, would have found it obvious to combine the teachings of Ronning with the teachings of Wolf, and incorporate a planar winding structure within the inductive device to minimize the size of the component in order to use it in a volume-restricted space.

Ronning in view of Wolf, discloses the claimed invention except for the coil ends having contact surfaces to facilitate surface mounting of the inductor to a PCB.

Boytor, et al, disclose a low profile inductive component comprising an insulated electric wire, wound around the center section of a core and having ends connected to the bottom of

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soldering pads. The ends are press fit against the soldering pads to ensure that the ends will be soldered to the lands on a PCB. (Column 4, lines 8-14) (Figure 1)

One skilled in the art, at the time the invention was made, would have found it obvious to combine the teachings of Ronning and Wolf with the teachings of Boytor, et al, and expose ends of an insulated conductor in order to ensure contact with a PCB.

Regarding claim 22, Ronning further discloses that the potting material may be a resin which will hold the inner core in place. Although applicant claims, “adhesive”, the term “adhesive” is generally defined as a substance that bonds two materials together. Because the potting material (resin) disclosed by Ronning holds the inner core in place, it was understood that this fits within the scope of the claim.

Regarding claim 23, Wolf further illustrates in figure 1C the use of a flattened oval shaped coil and inner core. The inner core and coil must be the same shape in order to further eliminate excess space.

Claims 12-20 and 24 are the method counterpart to product claims 1-11 and 21-23 and method steps are therefore inherent for constructing an inductor as claimed by the inventor.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Poker whose telephone number is 571-272-1997. The examiner can normally be reached on 5:00-3:30 Monday-Thursday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin G. Enad can be reached on 571-272-1990. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jap
July 22, 2004

Tuyen Nguyen

PRIMARY EXAMINER

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